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CENSUS CITIES EXPERIMENT IN URBAN CHANGE DETECTION

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Type I Progress Report for Period 31 January 1973 - 28 February 1973

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Type I Progress Report

ERTS-1

1 January 1973 - 28 February 1973

a. Title: Census Cities Experiment in Urban Change Detection. (ERTS-A
Proposal No.: SR-273)

b. GSFC ID No.: IN-084

c. Statement and explanation of impedance:

ERTS underflight photography has been received for all mandatory test sites except Pontiac. Back-ordered ERTS imagery is being received for some test sites. However, we still are not getting all coverage that is available for all of our test areas. We are not being sent any 70 mm positive transparencies (2 each band) nor 9 x 9 inch color composites (1 each) for any test sites as specified in our data product order.

d. Accomplishments during the reporting period and those planned for the next period:

Land use change detection work and ERTS imagery analysis for the Tucson test site was begun by Larry Lepley, Kenneth Foster, and Lay Gibson at the University of Arizona. 1972 change detection analysis for the Washington area by GAP inhouse staff is nearing completion and the one sheet 1970 land use map of Washington has been submitted for publication approval. The drafting of 1970 land use boundaries for open filing from manuscript maps compiled by Robert Simpson and associates at Dartmouth College is underway at USGS, Denver. This same task is planned also for New Haven.

Experimentation with land use information extraction from ERTS computer compatible tapes for part of the San Francisco test site is being conducted by Richard Ellefsen and Phillip Swain at LARS, Purdue using the LARSYSSA. James Wray reports on this work at the ERTS-1 Symposium, New Carrollton, Md. March 5-9.

On February 10, a field team comprised of GAP personnel conducted a one-day inspection of land use changes in the metropolitan Washington area between 1970 and 1972. Originally detected while analyzing high altitude aerial photography, about three-fourths of the changes can also be located on ERTS imagery. James Wray reports on the progress and application of this work at the ERTS-1 Symposium at New Carrollton, Md., March 5-9. The detailing of change detection procedures is receiving major staff attention. We are proposing a demonstration of an automated pattern recognition technique to detect textural differences, other than spectral difference which may be due merely to seasonal differences in vegetation.

User contacts during the reporting period included the following:
Office of Emergency Preparedness, Council on Environmental Quality,
Appalachian Regional Commission, USGS Urban Studies program, Montgomery County (Md.) Planning Commission, Defense Mapping Agency Image Interpretation School, State of Alaska Joint Federal and State Land Use Commission, Ambionics, Inc. (compiler of ERTS applications book commissioned by

NASA), University of Utah and Utah State Geological and Mineralogical Survey, Virginia Department of Highways (engineering consulting firm on I-66 route extension in metropolitan Washington), and U.S. Bureau of the Census.

The Census Bureau now has two main interests in the USGS Census Cities experiment in urban change detection. One is prompted by the interest of under-developed nations in U.S. technical assistance programs for demographic applications of remote sensing, especially use of ERTS-1 imagery. Another is greater use of remote sensing in the U.S. Censuses of Population and Housing. James Wray meets with a Bureau-wide Task Force on Remote Sensing Applications. The Bureau of the Census and USGS propose a joint ERTS-B experiment that will demonstrate the merging of ERTS scanner digital data with digitized socio-economic data for census statistical areas.

e. Scientific results and practical applications (Category 2E).

Computer compatible tapes for an early ERTS-1 Multispectral Scanner (MSS) image over the San Francisco Bay Area are being used to classify and analyze land use in this metropolitan region. NASA aircraft underflight data and land use maps from the Census Cities ERTS-1 experiment are providing "training samples." The tape record has been re-formatted for use with the LARSYSSA pattern recognition and classification algorithms developed at the Purdue University Laboratory for Applications of Remote Sensing. Trial land use classifications systems are being

compared with color infrared photography and ground truth data for San Jose and vicinity.

An exhibit is being prepared by USGS Exhibit Section which is to be displayed at the Annual Meeting of the Association of American Geographers in Atlanta, Georgia, April 15-18, 1973. The exhibit describes the use of ERTS-1 imagery for monitoring land use change and urban growth in the Boston test site.

f. Published reports or talks:

"An Operational Application of Orthophotomapping in a System of Urban Change Detection: An Example from the San Francisco Bay Region," by James S. Feng, Richard Ellefsen, Duilio Peruzzi, and James R. Wray, presented at the Orthophoto Workshop II, sponsored by the American Society of Photogrammetry and the American Congress on Surveying and Mapping, San Jose, California, January 18-23, 1973.

On February 21, James Wray spoke at the monthly meeting of the Inter-Agency Group, Office of Emergency Preparedness. He described urban change detection by remote sensors aboard high-altitude aircraft and ERTS. Many state and federal agencies have concerns for emergency preparedness and disaster relief. The use of remote sensing to monitor environmental hazards and catastrophic change is an important applications prospect.

g. Recommendations for improvement:

Recommend (1) collateral research in automatic pattern recognition of urban land use and land use change; (2) preparation of procedural manual for producing comparative urban analysis from high altitude photography, and (3) development of urban spatial growth model from comparative urban land use studies produced by this experiment. Proposals for these efforts have been submitted to, and accepted for funding by, the EROS Program Manager.

h. Changes in standing order forms:

No new changes since those noted last reporting period. However, some of those requested earlier have not yet been put into effect; (see Item C. above).